What is claimed is:

1. A method of inflating and deflating a catheter having an expandable membrane, the method comprising the steps of:

controllably inflating the expandable membrane to a target pressure or volume;

ablating a desired tissue region while maintaining the target pressure or volume of the expandable membrane; and

controllably deflating the expandable membrane.

2. The method of claim 1, further comprising keeping the expandable membrane inflated until a region proximate the expandable membrane reaches a predetermined temperature range.

3. The method of claim 1, wherein the steps of controllably inflating the expandable membrane to a target pressure or volume is performed by inflation/deflation control means located within a first console.

4. The method of claim 3, wherein the inflation/deflation control means is a Proportional Integral Derivative controller.

5. The method of claim 4, wherein the inflation/deflation control means further includes a pressure switch that controls an on/off valve.

6. The method of claim 1, wherein, if the target pressure or volume is not reached, further comprising the step of re-inflating the expandable membrane in order to reach the target pressure or volume.

7. The method of claim 6, wherein the step of re-inflating the expandable membrane is performed by a pressurized coolant source within an intermediary console located between the first console and the catheter.

8. The method of claim 7, wherein the pressurized coolant source is a fixed volume reservoir located within the first console.

9. The method of claim 1, wherein the step of ablating the desired tissue region is part of a cryoablation process.

10. The method of claim 1, wherein the step of ablating the desired tissue region is part of a radio frequency ablation process.

11. A method for inflating and deflating a catheter having an expandable membrane, the catheter being part of a catheter system including a first console, a catheter, and an umbilical system coupling the first console to the catheter, the method comprising the steps of:

evacuating air from the expandable membrane by creating a vacuum in the expandable membrane;

controllably inflating the expandable membrane proximate a desired tissue region, the expandable membrane being inflated to a target pressure or volume in order to provide sufficient mechanical force against the desired tissue region;

ablating the desired tissue region while maintaining the expandable membrane at the target pressure or volume; and

controllably deflating the expandable membrane.

12. An apparatus for inflating and deflating a catheter having a first expandable membrane, the apparatus comprising:

a first console including means for controlling the inflation and deflation of the first expandable membrane in order to reach a target pressure or volume;

a catheter; and

an umbilical system coupling the console to the catheter and delivering pressurized coolant to the first expandable membrane.

13. The apparatus of claim 12, wherein the first console includes means for determining if the first expandable membrane has reached its target pressure or volume.

14. The apparatus of claim 13, wherein the means for determining if the first expandable membrane has reached its target pressure or volume is a Proportional Integral Derivative controller.

15. The apparatus of claim 12, further comprising an intermediary console located between the first console and the catheter.

16. The apparatus of claim 15, wherein the intermediary console includes means for interrupting the flow of pressurized coolant from the first console to the catheter if the target pressure or volume has been exceeded.

17. The apparatus of claim 16, wherein the means for interrupting the flow of pressurized coolant from the first console to the catheter is a shut-off valve located within the intermediary console.

18. The apparatus of claim 15, wherein the intermediary console includes means for re-inflating the first expandable membrane.

19. The apparatus of claim 18, wherein the means for re-inflating the first expandable membrane is a source of pressurized coolant within the intermediary console.

20. The apparatus of claim 12, wherein the catheter further comprises a second expandable membrane, the first and second expandable membranes defining a safety vacuum space disposed between the first and second expandable membranes.

21. The apparatus of claim 20, further comprising a vacuum umbilical in communication with the safety vacuum space.

22. The apparatus of claim 21, further comprising a flow switch.

23. The apparatus of claim 22, further comprising a flow detector, the flow switch and flow detector being in fluid communication with the safety vacuum space.

24. The apparatus of claim 20, further comprising a pressure sensing element in communication with the safety vacuum space.

25. The apparatus of claim 20, further comprising a leak detection element in communication with the safety vacuum space.

26. The apparatus of claim 20, further comprising a blood detection element in communication with the safety vacuum space.

27. The apparatus of claim 20, further comprising a fluid detection element in communication with the safety vacuum space.

28. The apparatus of claim 12, further comprising a pressure sensing element in communication with a volume within the first expandable membrane.

29. The apparatus of claim 12, further comprising a leak detection element in communication with a volume within the first expandable membrane.

30. The apparatus of claim 12, further comprising a blood detection element in communication with a volume within the first expandable membrane.

31. The apparatus of claim 12, further comprising a fluid detection element in communication with a volume within the first expandable membrane.